

the most durable seed and the best protected rhizome must have lost all vitality during the intense heat, and not a germ was left. The whole island from the summit of the peak down to the water's edge is now covered with a layer of cinders and pumice stone, varying from one to sixty metres in thickness. Furthermore, the possibility of the new vegetation having been conveyed thither by man is out of the question, because the island is uninhabited, uninhabitable, and difficult of access.

Therefore, the present vegetation must be due to other agencies, of which three different ones may have operated—namely, winds, waves, and birds.

Now, as to the composition of the vegetation met with on Krakatã by Dr. Treub in June 1886, nearly three years after the eruption, the bulk consisted of ferns with isolated plants of Phanerogams, both on the shore and on the mountain itself. Eleven species of ferns were collected, and some of them were already common. They are all species of wide distribution, and it may be of interest to give their names: *Gymnogramme calomelanos*, *Acrostichum scandens*, *Blechnum orientale*, *Acrostichum aureum*, *Pteris longifolia*, *Nephrolepis exaltata*, *Nephrodium calcaratum*, *N. flaccidum*, *Pteris aquilina*, *P. marginata*, and *Onychium auratum*.

It is not at all surprising that the spores of the foregoing and many other ferns should have been carried to the island by winds; but, as Dr. Treub remarks, it is almost incomprehensible that they should grow under such extraordinarily disadvantageous conditions. Chemically and physically the volcanic matter covering the island is as sterile as could well be, yet the prothallia of ferns readily developed. A closer investigation, however, revealed the fact that ferns were not the first organisms in the new vegetation of Krakatã, the cinders and pumice-stone being almost everywhere covered with a thin coating of *Cyanophyceæ* (fresh-water Algæ) belonging to the genera *Lyngbya*, *Tolypothrix*, &c.,—altogether six species. The presence of these Algæ gives the surface of the soil a gelatinous and hygroscopic property, in the absence of which Dr. Treub doubts the possibility of fern-growth. Thus these microscopic organisms prepare the soil for the ferns, much as the latter provide the conditions under which the seeds of Phanerogams can germinate and grow.

The phanerogamic element (flowering plants) of the new vegetation consisted, on the shore, of young plants of *Calophyllum Inophyllum*, *Cerbera Odollam*, *Hernandia sonora*, *Scaevola Kanigii*, *Ipomœa pes-capræ*, a species of *Erythrina*, two species of *Cyperaceæ*, and *Gymnothrix elegans*. With the exception of *Gymnothrix elegans*, a common grass in Java, all the plants named are among those which take possession of newly-raised coral islands.

In the interior of the island, on the mountain itself, Dr. Treub discovered *Scaevola Kanigii*, *Tournefortia argentea*, a species of *Wollastonia*, a species of *Senecio*, two species of *Conyza*, *Phragmites Roxburghii*, and *Gymnothrix elegans*.

In addition to the foregoing Phanerogams, Dr. Treub observed on the sea-coast seeds or fruits of *Heritiera littoralis*, *Terminalia Catappa*, *Cocos nucifera*, *Barringtonia speciosa*, and *Pandanus*. These also are among the commonest sea-shore and coral island trees throughout the Malayan Archipelago and Polynesia.

A more interesting record of the processes of a new flora can hardly be imagined, especially that in relation to the preparation of the soil by microscopic sporiferous plants. Of course this is not a new discovery; but it is perhaps the first actual observation of the renewal of the vegetation of a volcanic island.

Dr. Treub intends visiting Krakatã again, and reporting fully on the progress of the new flora, and his report will doubtless be looked forward to with great interest.

W. B. HEMSLEY.

THE NON-CHINESE RACES OF CHINA.

A VALUABLE Report which has just been laid before Parliament contains an account of a journey made by Mr. Bourne, British Consular Agent at Chung-King in Szechuen province, through South-Western and Southern China, to study certain commercial questions in these regions. The journey lasted 193 days, and carried the traveller through the great provinces of Yunnan, Kwangsi, Kweichow, and Szechuen. Mr. Bourne was constantly brought into contact with various non-Chinese tribes inhabiting these provinces, and his Report contains a large amount of information respecting their language and habits. He also devotes a special appendix to them. He says that there is probably no family of the human race, certainly none with such claims to consideration, of which so little is accurately known as the non-Chinese races of Southern China, and he attributes this to the "perfect maze of senseless names" in which the subject has been involved by the Chinese. The "Topography of the Yunnan Province," published in 1836, gives a catalogue of 141 classes of aborigines, each with a separate name and illustration, without any attempt to arrive at a broader classification. To Mr. Bourne it appeared that before the tribes could be scientifically assigned by ethnologists, they must be reduced to order amongst themselves, and that something might be done in this direction by taking a short vocabulary and obtaining its equivalent in the dialect of every tribe met with, when a comparison would reveal affinities and differences. Accordingly he gives twenty-two vocabularies, containing the numerals up to 12, 20, 30, 100, 1000, father, mother, brother, sister, heaven, gold, hand, foot, sun, dog, horse, iron, &c.—in all, thirty-six words. In each case the date, place, the name by which each tribe calls itself, the name by which the Chinese know it, and the name by which it knows the Chinese, is given. A comparison of these vocabularies and a study of Chinese books lead him to the conviction that, exclusive of the Tibetans, there are but three great non-Chinese races in Southern China—the Lolo, the Shan, and the Miao-tsze. The vocabularies do not convey the whole evidence that these scattered people respectively speak the same language, for the Lolo, Shan, and Miao-tsze are all languages of the Chinese type that make up for poverty of sound by "tones"; the resemblance is much more striking to the ear accustomed to these distinctions of sound than when the words are written in English, when the similarity of tone is lost. Among the 141 tribes described in the Chinese topography of Yunnan, with short vocabularies of the principal dialects, there are very few, and those unimportant, that cannot be identified from the illustrations or letterpress as belonging to one or other of the three families or to Tibetan. As to the names of these families, Lolo is a Chinese corruption of Lulu, the name of a former chieftain of the people, who call themselves Nersu, and has come to stand for the people themselves. Shan is the Burmese term adopted by Europeans for the people who call themselves "Tai," "Pu-nong," &c. Miao-tsze, a Chinese word, meaning "roots," is confined by the more accurate to the aborigines of Kweichow and Western Hunan.

The Lolos were formerly called by the Chinese the "Tsuau barbarians," a name taken from one of their chiefs. They call themselves Nersu, and the vocabularies show that they stretch in scattered communities as far as Ssu-mao, and along the whole southern border of Yunnan. They are also said by the Chinese to be found on the Burmese frontier. In a topography of Momien, a town not far from Bahmo, in the extreme south-west of Yunnan, the following information is given about them, which is at least surprising:—"The old Tsuan (Lolo) of Mengshan do not die. When old, they grow tails, eat men, not distinguishing their own children,

love the hills, fear the abodes of men, and run as strongly as wild beasts. The natives call them autumn foxes. But, still, they are not invariably to be found." Although it is not yet known where the Lolo came from, Mr. Bourne gives a notion of their present habitat. In the great bend of the Yangtze, in 103° E. longitude, between that river and the Anning, the Lolo are at home; there they live in independence of China, under their own tribal chiefs and aristocracy. Thence they extend in a scattered manner as far north as Wen chuan, in latitude $31^{\circ} 15' N.$, and longitude $103^{\circ} 30' E.$ To the west they extend to the Meikong; to the south they are found occupying here and there the higher ground, until the plateau breaks into the plain, and they extend eastward to Kweiyang. They seem to be more numerous as Taliang Shan, their present home, is approached, and they form much the largest part of the population of North-Eastern Yunnan and North-Western Kweichow. Mr. Bourne adds about thirty names by which different tribes of Lolo are known to the Chinese.

The Shans are not found north-east of the city of Yunnan, but they inhabit all the lower levels along the south Yunnan border; and from the city of Kwang-nan along Mr. Bourne's route to the frontier of Kweichow province, they form almost the whole population. They must have been masters of the Kwangsi province before the Chinese, as some of the Chinese official buildings in the province are said to have been erected on the sites of Shan palaces. It would be interesting, says Mr. Bourne, to know how the Shans reached Kwangsi, whether through Tonquin or across the Yunnan plateau. The Shans in Southern Kweichow are undoubtedly immigrants from Kwangsi, and did not cross the plateau. The Shan language is softer than Chinese or Lolo, with fewer gutturals and aspirates, and appears easy to learn. The numerals show a curious resemblance in sound to the Cantonese.

The Miao-tzse apparently are divided into a number of tribes speaking dialects of one language which is of the Chinese sort. They occupy at present Eastern Kweichow and Western Hunan, being very numerous in the south-east of the former province. They are known to the Chinese by a multitude of names, but always with the prefix Miao.

So far the appendix; but scattered throughout Mr. Bourne's elaborate report of his journey there are numerous interesting references to these non-Chinese races. Near Maling, in Southern Yunnan, on a tributary of the Yangtze, he came on a sandstone bluff containing about twenty Mantzu caves. Most of the entrances, 3 to 4 feet square, are cut in the vertical cliff some 10 feet above the ground, so that they cannot be reached without a ladder. The face of the cliff is adorned in one or two cases by sculptures in relief, the most striking being a round human face. The valley was, no doubt, formerly the head-quarters of a Mantzu tribe, for some miles lower down the site of the castle of a chief is pointed out. The sculptured blocks that lie about bear witness to a considerable advance in civilization. The Lolos are described as having larger and more irregular features than the average Chinese; the colour of the skin seems much the same, but the eyes were deeper sunk. They are divided into three tribes, known as the black, white, and dry Lolos—a meaningless distinction, but corresponding apparently to a real tribal division. They believe in a future state of retribution, burn the dead, worship their ancestors with the sacrifice of an ox, and have no idols. Four pieces of brown paper were said to represent the potentialities of the other world, and three sticks of bamboo their ancestors. A special Lolo vocabulary, with the written characters, procured from a *perma*, or tribal sorcerer, in Ssu-mao, is carefully reproduced. This sorcerer was able to read his prayer-book, but not to explain what it meant. In his own opinion this was not

important, as the ritual had been arranged between his ancestors and the gods, who knew very well what was meant so long as he read the right section and gave the characters their proper sound.

The Report it should be added contains numerous and comprehensive tables of meteorological observations and levels, although the rate of travelling prevented anything like a running survey being made.

THE BATH MEETING OF THE BRITISH ASSOCIATION.

THIS will be the fifty-eighth meeting of the British Association for the Advancement of Science. Twenty-four years ago—in 1864—the Association met at Bath under the presidency of the late Sir Charles Lyell. So many other names are now missing, that the retrospect is the reverse of cheering. Sir Roderick Murchison, Admiral Fitzroy, Dr. Whewell, Sir John F. W. Herschel, Sir David Brewster, Dr. William Farr, Prof. Fawcett, Dr. Livingstone, Capt. Maury, and Mr. Scott Russell, are only a very few of the numerous names of note that spring to the memory in connection with the last Bath meeting.

But if this is the retrospect, the prospect is in every way most satisfactory. Under the genial presidency of Sir Frederick Bramwell, with the aid of very efficient local officers, a thoroughly successful meeting may fairly be looked for. Bath has the advantage of a good position for railway facilities. It is not more than $2\frac{1}{2}$ hours from London, 2 from Exeter, $1\frac{1}{2}$ from Cardiff, $1\frac{1}{2}$ from Birmingham, and $5\frac{1}{2}$ from Manchester. The endeavours of the Local Executive Committee to obtain the issue of cheap tickets, as usual, have been crowned with success. As Bath—strangely enough—does not possess a Public Hall, a temporary building, to serve as reception-room and offices, is in course of erection, at a cost of some £700. The President's address, the evening discourses, and Sir John Lubbock's lecture to working men will be given in the Drill Hall.

It is unnecessary to say anything as to the fitness of Sir Frederick Bramwell for the office of President. The following are the Presidents of the Sections:—Mathematics and Physics, Prof. Schuster; Chemistry, Prof. Tilden; Geology, Prof. Boyd Dawkins; Biology, Mr. Thiselton Dyer; Geography, Sir Charles Wilson; Statistics, Lord Bramwell; Mechanics, Mr. Preece; Anthropology, General Pitt-Rivers.

Bath itself is so well known as to need very few words. The old Roman Bath and its adjuncts, recently uncovered, with other remains, will of course excite general interest. Attention will also be given to the new buildings erected by the Corporation to meet the increasing demand for the Bath waters. On every side the city is surrounded by objects that will interest the geologist, the archæologist, and the lover of the picturesque. Provisional arrangements have been made for a set of excursions—half-day, on Thursday, September 6, and whole day on Saturday, September 8—to Stantonbury, Stanton Drew, Maes Knoll; Dyrham, Sodbury Camp, Bannerdown; Stourton, Pen Pits, Whitesheet, Longleat; Frome, Wells, Glastonbury, Cheddar, Chepstow, Tintern, Box Quarries, Cirencester, Severn Tunnel, Tytherington, Thornbury, Berkeley, Ebbor Gorge, Wookey, and elsewhere.

PROF. H. CARVILL LEWIS.

THE loss to the geological world by the death of Prof. Henry Carvill Lewis at the early age of thirty-four, and in the midst of his work, is greater than they may realize, as the more important of his results acquired during the last three years have not been fully published. When, in 1882, he began to study the glacial phenomena of